Natural History in its Educational Aspects.

BY J. W. DAWSON, A. M. F. G. S. &C.,

PRINCIPAL OF M'GILL COLLEGE, MONTREAL.

(Extracts from the Introductory Lecture of the Popular course of the Natural History Society of Montreal, Winter of 1856-7.)

Reprinted from Barnard's American Journal of Education for June, 1857.

XI. NATURAL HISTORY IN ITS EDUCATIONAL ASPECTS.

BY J. W. DAWSON, A. M. F. G. S. &C.,

PRINCIPAL OF M'GILL COLLEGE, MONTREAL.

(Extracts from the Introductory Lecture of the Popular course of the Natural History Society of Montreal, Winter of 1856-7.)

THIS Society wisely regards as one of its functions, the cultivation among its members and the public in general, of a taste for those useful and ennobling pursuits to which it is devoted. Viewing this as the principal object of the popular course, the introductory lecture of which I have the honor of delivering, I have determined, instead of selecting any special scientific subject, to lay before you a few general thoughts on the importance of Natural History, as a branch of education; understanding by that term the training of our mental powers, of our æsthetic sentiments, and our moral faculties; and this not only in our Schools and higher Institutions of learning, but in our self-cultivation throughout life.

Man and the nature that surrounds him, are products of the same almighty, all-pervading mind. Hence man finds natural things adapted to his wants and powers, and can perceive in them a likeness to the results at which his own taste and reason arrive—finding thus fixed law, progressive movement, beauty, adaptation, and order, in nature, similar to those which exist in his own works, but of a higher type. Man's soul is thus the link between the spiritual Creator and the material creation; and this appears to be the real central truth of all those dark though exciting controversies, on the relations of the subjective and the objective in man and nature, which have bewildered the minds of those who, leaving the firm ground of revealed religion and inductive science, have wandered into the mists and darkness which shroud from our gaze the precise junction of the spiritual and the material. The middle path that leads between the opposite errors of transcendentalists and materialists, is the old familiar truth of our infancy, that man was made in the image of that God who made all things and pronounced them good.

Thus constituted, man must sympathize with nature, must observe its objects, must reason on them; and nature must react on man, strengthening and stimulating the faculties that act on it, and more

or less deepening on his mind the impress of that of the Creator of both. It is principally to this last aspect of the subject, the reaction of nature on ourselves, that I wish to direct your attention.

In this respect then, the study of nature presents itself in the first place, as a means of training the observing powers. This is an office strictly educational, and strictly elementary. Observation of external things begins in earliest infancy, and is essential to the happiness, the utilities, and even the safety of after life. It has been apparently a subject of doubt with modern educators, whether in this direction we require any training whatever. This has at least been strangely neglected in schools and colleges. We have been content to know that the savage can teach his children without any school or college, to detect and distinguish with the nicest discrimination, the minutest traces of men and animals; while civilized men highly cultivated in other respects, are often deficient in such powers to the last degree.

To what extent are such powers actually deficient in the generality of educated men? to what extent are they desirable in civilized life? to what extent can they be cultivated? In attempting to answer such questions, it is but fair to admit that, in many handicraft trades, and in the prosecution of the fine arts, the observing powers are extensively cultivated in persons of very different degrees of education. On the other hand, it can not be denied that men of the highest education are often remarkably unobservant; sometimes peculiarly so, insomuch that their absent-mindedness, as it is called, has become proverbial; while the mass of men, apart from the special points to which business directs their attention, have little useful perception of outward things, in comparison with that which they might attain. The accounts of natural objects and scenes given by popular writers, and in conversation; and the extraordinary diversity of the evidence respecting matters of fact in our courts of law, sufficiently show the prevailing deficiency in accurate observation. It is deserving of note, also, that this deficiency is often only aggravated by the superior development of the reflective and imaginative powers; because in this case the observer is induced to substitute his own fancies and speculations for matters of fact. Much of the want of originality, and distortion of natural truth, which we lament in our literature, as compared with that of earlier and simpler states of society, proceeds from the same cause.

That the removal of these defects is desirable, I think no judicious educator will doubt. They are in part remedied by the object lessons in our primary schools, by the drawing, the music, the natural history of our more advanced schools; by the natural science of our colleges; and under these influences we may hope that among the educated

men now leaving our institutions of learning, we shall have more independent observation and originality, and less pedantry and absence of mind, than in those of former times. That these results may be fully attained, the study of nature must have a due place in education, and this it can attain only by engaging, as far as may be, the most gifted original investigators, to train the minds of others. Much of the teaching of natural history by object lessons and popular text-books, is too inaccurate and superficial, and too deficient in enlargement of view, to be really useful. In our colleges and scientific institutions, nature should be illustrated by the best possible collections of typical forms, explained and examined under the guidance of the best scientific skill. In the training of the teachers of the elementary schools, similar influences should be employed; that through them a higher kind of training of the senses and perceptive faculties may be given to those who do not receive the benefit of a collegiate education. In this way alone, will it be possible to send forth men and women trained to the right use of their senses, as well as of their reflective powers.

I have already suggested the connection between defective training of the observing powers and want of originality in literature, and want of accurate and truthful description in ordinary conversation and in public testimony. I may add that this same deficiency is closely connected with the prevalence of many of the errors that spread like epidemics through society. No one who has witnessed the ready faith in the feats of table-turners, accorded even by cultivated assemblages, and the evident want of perception in such cases of the real agencies producing the results observed, need doubt that cultivation of the reflective and imaginative faculties, without that of the observing powers, may leave us exposed to the most dangerous consequences. In no way can society be more effectually delivered from such delusions than by cultivating aright our powers of observation by the study of nature.

Nature also affords a large scope for the training of our thinking powers, whether those which are concerned in abstraction and analysis, or the comparison of facts and objects, or those which relate to the investigation of cause and effect. The careful comparing of objects, and the estimation of the amount and value of their differences, required in the determination and classification of species in natural history; the separation of qualities common to many species form those peculiar to one; the distinction between structures properly homologous and those which are merely analogous, the tracing of the functions and uses of structures; the application of modern causes to the

explanation of the ancient phenomena of the earth's crust, and many other operations required in the study of nature, not only cultivate habits of observation, but the reasoning powers, in directions not so much within the scope of other branches of education. Such investigations have also a powerful influence in cultivating the love of truth, and those mental habits which lead to acuteness and earnestness in working out the many contingent problems of ordinary life, which lie beyond the domain of the exact sciences. On this account the study of nature does not tend to alienate the mind from the ordinary business of life. This is well exemplified in the works of modern scientific travelers. Such men as Humboldt, Lyell and Darwin, even when they digress from their own immediate field of study, and enter on social habits and questions, give us representations more truthful, and reasonings more profound than those of ordinary travelers, because they carry to these things the mental habits which they have cultivated in their own proper department.

Natural History also claims a high position in education, in connection with the cultivation of taste—that appreciation of the truly grand and beautiful which opens up so many avenues of innocent pleasure, and is so intimately connected with the right exercise of our higher moral sentiments. A very high authority informs us, that the kingly state of the most sumptuous of Eastern monarchs, was inferior to that of the lily of the field; and we but announce a principle whose germ is hidden in that beautiful illustration, in saying that nature transcends art, not only in its grandeur, its varied contrivance, and self-sustaining power, but also in the beauty of its objects considered with reference to our æsthetic powers and preferences.

The world has worshipped art too much, reverenced nature too little. The savage displays the lowest taste when he admires the rude figures which he paints on his face or his garments, more than the glorious painting that adorns nature: yet even he acknowledges the preëminent excellence of nature, by imitating her forms and colors, and by adapting her painted plumes and flowers to his own use. There is a wide interval, including many gradations, between this low position, and that of the cultivated amateur or artist. The art of the latter makes a nearer approach to the truly beautiful, inasmuch as it more accurately represents the geometric and organic forms, and the coloring of nature; and inasmuch as it devises ideal combinations not found in the actual world; which ideal combinations, however, are beautiful or monstrous, just as they realize or violate the harmonies of nature.

I do not wish here so to depreciate art, as to raise the question—why

should there be such a thing as fine art? Why we should attempt to imitate that which we can not equal, and which yet every where surrounds us? The necessities of man's fallen nature—his desire to perpetuate the perishing forms dear to him—his own conceptions of the beautiful, and his longing to realize them—his ambitious wish to create something that may give him an undying reputation—his idolatrous desire to embody in material form, something that he or others may reverence or worship; these and such reasons are sufficient to account for art aspirations, as constant products of our mental constitution. Let us accord to art the admiration which it deserves, but let us not forget that nature is the highest art—*the* art which embraces in itself all else that truly deserves the name.

One essential difference between imitative art and nature, in reference to our present subject, is that the former is wholly superficial, while the latter has an inner life and finer structure, corresponding to its outward form. The painter's bouquet of flowers, may charm us with its fine combination of forms and colors, and with the thought and taste that speak in every hue and tint; but examine it closely and it becomes merely a mass of patches of colors, in which the parts of the actual flowers are but rudely shadowed forth. The natural flower, on the other hand, yields to the closest examination, only new structures and more delicate beauties not perceived at the first glance; and even under the microscope, we find it pregnant with new wonders, so that if we represent separately all its various parts and internal structures, we have a series of pictures, each full of beauty and interest, and the whole showing us that the painter's genius has availed only to depict that outer layer of charms which lies at the very surface: and then in the actual flower, we have all those changes of beauty that march in procession from the unfolding bud to the ripening fruit. Truly may the lily of the field laugh to scorn the efforts of human art.

In like manner the Apollo of the Sculptor may represent, not only years of study and laborious days of delicate chiseling, but also a beau-ideal of manly symmetry and grace, such as we can seldom find approached in the real world; but take for comparison, the living, well-developed human form, and you have an object infinitely more full of beauty. Every motion of such a form is a new statue. In a few minutes it gives you a whole gallery of varied attitudes, and then within, you have the wondrous mechanism of bones and muscles, which, if not individually beautiful, become so to our inner mental vision, when we consider their adaptation to this infinity of graceful form and motion. The frame contrived to enshrine the immortal

mind of man, is the chief of the works of God known to us, and is not the less beautiful, that in our present fallen state, considerations, both moral and physical, require that the nakedness which was its primeval glory and distinction, should be covered from our sight. It is a high ambition that fires the sculptor with the hope, that he shall be able to embody even one of those attitudes that speak the emotions of the soul within. Yet after he has exhausted all his art, how cold, how dead, how intensely wearisome and monotonous, when compared with the living form, is the changeless beauty of the statue.

The littleness of art is equally apparent when it attempts to rival the grandeur of nature. Her towers and spires have less effect than those rocky pinnacles and mountain peaks, her pillared porticos do not equal nature's colonnades of stately trunks and graceful foliage. We habitually acknowledge this, when we adorn our finest buildings with surrounding trees, just as nature masks with foliage the bases of rude cliffs, and the flanks of precipices.

Art takes her true place when she sits at the feet of nature, and brings her students to drink in its beauties, that they may endeavor, however imperfectly, to reproduce them. On the other hand, the naturalist must not content himself with "writing latin names on white paper," wherewith to label nature's productions, but must rise to the contemplation of the order and beauty of the Kosmos. Both will thus rise to that highest taste, which will enable them to appreciate not only the elegance of individual forms, but their structure, their harmonies, their grouping and their relations, their special adaptation and their places as parts of a great system. Thus art will attain that highest point in which it displays original genius, without violating natural truth and unity, and nature will be regarded as the highest art.

Much is said and done in our time, with reference to the cultivation of popular taste for fine art, and this so far as it goes is well; but if the above views are correct, the only sure path to success in art education, is the cultivation of the study of nature. This is also an easier branch of education, provided the instructors have sufficient knowledge. Good works of art are rare and costly; but good works of nature are every where around us, waiting to be examined. Such education, popularly diffused, would react on the efforts of art. It would enable a widely extended public to appreciate real excellence, and would cause works of art to be valued just in proportion to the extent to which they realize or deviate from natural truth and unity. I do not profess to speak authoritatively on such subjects, but I confess that the strong impression on my mind is, that neither the

revered mediæval models, nor the practice and principles of the generality of modern art reformers, would endure such criticism; and that if we could combine popular enthusiasm for art, with scientific appreciation of nature, a new and better art might arise from the union.

I may have appeared to dwell too long upon this part of my subject; but if so, my excuse must be that it leads to the vastly more important use to which I have now to refer. The study of nature guides to those large views of the unity and order of creation, which alone are worthy of a being of the rank of man, and which lead him to adequate conceptions of the Creator. The truly wise recognize three grades of beauty. First, that of art, which in its higher efforts, can raise ordinary minds far above themselves. Secondly, that of nature, which in its most common objects, must transcend the former, since its artist is that God, of whose infinite mind the genius of the artist is only a faint reflection. Thirdly, that preëminent beauty of moral goodness, revealed only in the spiritual nature of the Supreme. The first is one of the natural resources of fallen man in his search for happiness. The second was man's joy in his primeval innocence. The third is the inheritance of man redeemed. It is folly to place these on the same level. It is greater folly to worship either or both of the first, without regard to the last. It is true wisdom to aspire to the last, and to regard nature as the handmaid of piety, art as but the handmaid of nature.

Nature to the unobservant, is merely a mass of things more or less beautiful or interesting, but without any definite order or significance. An observer soon arrives at the conclusion that it is a series of circling changes, ever returning to the same points, ever renewing their courses, under the action of invariable laws. But if he rests here, he falls infinitely short of the idea of the Kosmos; and stands on the brink of the profound error of eternal succession. A little further progress conducts him to the inviting field of special adaptation and mutual relation of things. He finds that nothing is without its use; that every structure is most nicely adjusted to special ends; that the supposed ceaseless circling of nature is merely the continuous action of great powers, by which an infinity of utilities are worked out—the great fly-wheel, which in its unceasing and at first sight apparently aimless round, is giving motion to thousands of reels and spindles and shuttles that are spinning and weaving, in all its varied patterns, the great web of life.

But the observer as he looks on this web, is surprised to find that it has in its whole extent a wondrous pattern. He rises to the contemplation of type in nature, a great truth to which science has only

lately opened its eyes. He begins dimly to perceive that the Creator has from the beginning had a plan before his mind, that this plan embraced various types or patterns of existence; that on these patterns he has been working out the whole system of nature, adapting each to all the variety of uses, by an infinity of minor modifications. That in short, whether he study the eye of a gnat, or the structure of a mountain chain, he sees not only objects of beauty and utility, but parts of far-reaching plans of infinite wisdom, by which all objects, however separated in time or space, are linked together

Natural history, rising from the collection of individual facts to such large views, does not content itself with merely naming the objects of nature. A naturalist is not merely a man who knows hard names for many common or uncommon things, or who collects rare and curious objects, and can tell something of their habits and structures. His studies lead him to grand generalizations, even to the consideration, in part at least, of the plans that from eternity existed in the infinite mind, and guided the evolution of all material things. Natural history thus rises to the highest ground occupied by her sister sciences, and gives a mental training which in grandeur, can not be surpassed, inasmuch as it leads her pupils as near as man may approach, to those counsels of the Almighty in the material universe, which are connected, at least by broad analogies, with our own moral and religious interests.

It follows from the preceding views, that the study of nature forms a good training for the rational enjoyment of life. How much of positive pleasure does that man lose who passes through life absorbed with its wants and its artificialities, and regarding with a "brute, unconscious gaze," the grand revelation of a higher intelligence in the outer world. It is only in an approximation through our Divine Redeemer to the moral likeness of God, that we can be truly happy; but of the subsidiary pleasures which we are here permitted to enjoy, the contemplation of nature is one of the best and purest. It was the pleasure, the show, the spectacle prepared for man in Eden, and how much true philosophy and taste shine in the simple words, that in that paradise, God planted trees "pleasant to the sight," as well as "good for food;" and other things being equal, the nearer we can return to this primitive taste, the greater will be our sensuous enjoyment, the better the influence of our pleasures on our moral nature, because they will then depend on the cultivation of tastes at once natural and harmless, and will not lead us to communion with, and reverence for merely human genius, but will conduct us into the presence of the infinite perfection of the Creator. Nature is thus less likely

to lead to idolatry than art. Hence the Holy Scriptures, which guard so jealously against the tendencies of human nature to exalt itself and its works into divinities, every where recognize nature as a secondary revelation of God. So deep is the degradation of man, that even in the contemplation of nature, he tends to rest contented with the material creation—to abase himself in idolatrous veneration of the creature, rather than to worship the Creator. But if men will depart from the true God, even in this way, I may still be permitted to maintain that the Chaldean or Egyptian, who recognized the hosts of heaven, or the creeping things of earth, as fit emblems of Deity, or the naturalist, whose religion rises no higher than the theism to be gathered from nature, has a nobler faith than that of the Greek who worshipped the Phidian Jove, or the modern amateur who adores the genius of Raphael or Michael Angelo.

I have sought to magnify the office of this Society, on educational grounds alone; but I can not conclude without reminding you that natural science has its utilitarian aspects. All our material wealth consists of the objects of natural history. All our material civilization consists of such knowledge of these things, as may give us mastery over their uses and properties. Such knowledge is every day finding its reward, not merely in the direct promotion of the happiness of its possessor, but in enabling him to add to the comforts of our race, or to diminish the physical evils to which they are exposed. Into this subject, however, I can not now enter; and this is the less necessary, since the minds of nearly all intelligent men are sufficiently alive, at least, to the utilitarian value of the natural Sciences.

THE

American Journal of Education.

No. IX.—JUNE, 1857.

CONTENTS.

SUPPLEMENT TO NUMBER IX.

THE AMERICAN JOURNAL OF EDUCATION, will continue to be published by the undersigned, under the editorial charge of Henry Barnard, LL. D.,

TERMS.

FOR A SINGLE COPY, one year, (1857,) or for Volumes III. and IV., (Numbers 8, 9, 10 and 11,) $3.00

FOR VOLUME III., or Nos. 8 and 9, ... 2.00

FOR VOLUME IV., numbers 10 and 11, as published, and without being a subscriber to Volume III., ... 2.00

FOR A SINGLE NUMBER, ... 1.00

☞ *All subscriptions are payable in advance.*

Exchange Papers and Catalogues should be directed to *Barnard's American Journal of Education*, Hartford, Conn.

All communications, intended for or relating to the contents of the Journal, should be directed to the editor. All business letters to the undersigned.

Volumes I. and II., can be had for $2.00 per volume, in numbers, or for $2.25, bound in cloth.

A circular, containing the Contents and Index of Volumes I. and II., will be sent by mail to any one making request for the same.

POSTAGE.—To every subscriber, who will forward ($3.25,) three dollars and twenty-five cents, the Journal for the year 1857, including any Supplementary Number, will be sent FREE OF POSTAGE. F. C. BROWNELL, HARTFORD, CONN.